LISTING OF THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1-29. (Canceled)

30. (Currently amended) A method of controlling a welding process having a plurality of welding cycles, comprising:

advancing and reversing a consumable electrode ~~towards~~ with respect to a workpiece; and

dynamically regulating a rate of advancement and reversal of said consumable electrode within a short circuit welding cycle and ~~an~~ instantaneously altering a melting rate of said consumable electrode during each of said plurality of welding cycles in response to [[a]] predetermined voltage variations that are indicative of a short circuit or a short circuit rupture event that ~~occurring~~ occurs during said short circuit welding cycle ~~process~~.

31. (Currently amended) The method of claim 30, further comprising coordinating said instantaneous melting rate with said rate of advancement and reversal of said consumable electrode in response to said predetermined voltage variations.

32. (Previously presented) The method of claim 30, further comprising controlling a source of power that is supplied to said consumable electrode.

33. (Previously presented) The method of claim 32, wherein said source of power produces a current waveform.

34. (Previously presented) The method of claim 30, further comprising monitoring a feedback signal associated with said welding process.

35. (Currently amended) The method of claim 34, wherein said feedback signal ~~employs~~ includes a voltage for determining said short circuit or said short circuit rupture event.

36. (Currently amended) The method of claim 35, wherein said feedback signal ~~employs~~ includes a current that is representative of said instantaneous melting rate.

37. (Previously presented) The method of claim 30, further comprising sampling conditions associated with said welding process for a purpose of obtaining information for identifying said predetermined event in real time.

38. (Previously presented) The method of claim 37, further comprising processing said information to obtain a first reference signal for regulating said rate of advancement of said consumable electrode.

39. (Previously presented) The method of claim 37, further comprising: sampling conditions associated with said welding process to obtain information for identifying said predetermined event in real time, and processing said information to obtain a second reference signal for controlling said melt rate of said consumable electrode.

40. (Previously presented) The method of claim 30, wherein said welding process uses a shielding gas.

41. (Previously presented) The method of claim 40, wherein said shielding gas includes carbon dioxide.

42. (Previously presented) The method of claim 30, wherein said welding system operates in a dip transfer mode wherein each welding cycle includes an arcing phase during which said consumable electrode is spaced from said workpiece and an arc is generated across said space, said arc being operative to form a molten droplet on an end of said consumable electrode, and a short circuit phase during which said consumable electrode is in contact with said workpiece, each welding cycle changing from said arcing phase to said short circuit phase on contact of said molten droplet with said workpiece, and changing from said short circuit phase to said arcing phase after rupturing of a bridge of molten material formed between said consumable electrode and said workpiece.

43. (Previously presented) The method of claim 42, further comprising: conditioning said welding system to form a molten droplet on the electrode end during the arcing phase which has a diameter greater than the diameter of said consumable electrode, and causing said molten droplet to detach from said consumable electrode after said molten droplet has come into contact with said workpiece to thereby ensure a short circuit and arcing phase occurs in each welding cycle.

44. (Currently amended) ~~An~~ A short circuit arc welding system comprising:

a power source, and

a control unit and means for advancing and reversing a

consumable electrode ~~towards~~ with respect to a workpiece during a welding process, said consumable electrode being energized by said power source to cause said consumable electrode to supply molten material to said workpiece, wherein said means for advancing and reversing is controlled by said control unit to dynamically regulate a rate of advancement and reversal of said consumable electrode within a short circuit welding cycle in response to an ~~predetermined~~ event occurring during said welding process indicated by predetermined voltage variations that are indicative of a short circuit or a short circuit rupture event that occurs during said short circuit welding cycle.

45. (Currently amended) The welding system of claim 44, wherein said power source is controlled by said control unit in response to said predetermined voltage variations ~~event~~ to control an instantaneous melting rate of said consumable electrode.

46. (Currently amended) The welding system of claim ~~45~~ 47, wherein said ~~control unit~~ feedback signal is adapted to coordinate said instantaneous melting rate with said rate of advancement and reversal of for said consumable electrode.

47. (Currently amended) The welding system of claim ~~44~~ 45, further comprising a means for obtaining a feedback signal associated with said welding process.

48. (Currently amended) The welding system of claim 47, wherein said feedback signal includes a voltage for determining said short circuit or said short circuit rupture event.

49. (Currently amended) The welding system of claim 48, wherein said feedback signal includes a current that is representative of said instantaneous melting rate of said consumable electrode.

50. (Previously presented) The welding system of claim 44, wherein said control unit is adapted to sample conditions associated with said welding process to obtain information for identifying said predetermined event in real time.

51. (Currently amended) The welding system of claim 50, wherein said control unit is adapted to instantaneously process said information to obtain a first reference signal for regulating said rate of advancement and reversal of said consumable electrode in response to said predetermined voltage variations.

52. (Currently amended) The welding system of claim 50, wherein said control unit is adapted to instantaneously process said information to obtain a second reference signal for controlling said melting rate of said consumable electrode in response to said predetermined voltage variations and to coordinate said melting rate with said rate of advancement and reversal of said consumable electrode.

53. (Previously presented) The welding system of claim 44, wherein said welding process uses a shield gas.

54. (Previously presented) The welding system of claim 53, wherein said shielding gas includes carbon dioxide.

55. (Previously presented) The welding system of claim 44, wherein said welding system operates in a dip transfer mode over a plurality of welding cycles, wherein a welding cycle includes an arcing phase during which said consumable electrode is spaced from said workpiece and an arc is generated across said space, said arc being operative to form a molten droplet on the end of said consumable electrode, and a short circuit phase during which said consumable electrode is in contact with said workpiece, each welding cycle changing from said arcing phase to said short circuit phase on contact of said molten droplet with said workpiece, and changing from said short circuit phase to said arcing phase after rupturing of a bridge of molten material formed between said consumable electrode and said workpiece.

56. (Previously presented) The welding system of claim 55, comprising: means for conditioning said welding system to form said molten droplet on an end of said consumable electrode during said arcing phase which has a diameter greater than a diameter of said consumable electrode, and means for causing said molten droplet to detach from said consumable electrode after said molten droplet has come into contact with said workpiece to thereby ensure a short circuit phase occurs in said welding cycle.